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| APPLICATION NO. | FILING DATE | FIRST NAMED INVENTOR | ATTORNEY DOCKET NO. | CONFIRMATION NO. |
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10/621,447

07/18/2003

Yong-Sik Kwon

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10/18/2006

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EXAMINER

MALEK, LEILA

ART UNIT

PAPER NUMBER

2611

DATE MAILED: 10/18/2006

Please find below and/or attached an Office communication concerning this application or proceeding.

Office Action Summary

Application No.

10/621,447

Applicant(s)

KWON ET AL.

Examiner

Leila Malek

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-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) OR THIRTY (30) DAYS, WHICHEVER IS LONGER, FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

- 1) ☒ Responsive to communication(s) filed on 07/18/2003.
- 2a) ☐ This action is **FINAL**. 2b) ☒ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

- 4) ☒ Claim(s) 1-16 is/are pending in the application.
- 4a) Of the above claim(s) _____ is/are withdrawn from consideration.
- 5) ☐ Claim(s) _____ is/are allowed.
- 6) ☒ Claim(s) 1,7-9,15 and 16 is/are rejected.
- 7) ☒ Claim(s) 2-6 and 10-14 is/are objected to.
- 8) ☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

- 9) ☒ The specification is objected to by the Examiner.
- 10) ☒ The drawing(s) filed on 18 July 2003 is/are: a) ☒ accepted or b) ☐ objected to by the Examiner.
Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).
Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).
- 11) ☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. § 119

- 12) ☒ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
- a) ☒ All b) ☐ Some * c) ☐ None of:
- 1) ☒ Certified copies of the priority documents have been received.
 - 2) ☐ Certified copies of the priority documents have been received in Application No. _____.
 - 3) ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

* See the attached detailed Office action for a list of the certified copies not received.

Attachment(s)

- | | |
|--|---|
| 1) <input checked="" type="checkbox"/> Notice of References Cited (PTO-892) | 4) <input type="checkbox"/> Interview Summary (PTO-413) |
| 2) <input type="checkbox"/> Notice of Draftsperson's Patent Drawing Review (PTO-948) | Paper No(s)/Mail Date. _____ |
| 3) <input type="checkbox"/> Information Disclosure Statement(s) (PTO/SB/08) | 5) <input type="checkbox"/> Notice of Informal Patent Application |
| Paper No(s)/Mail Date. _____ | 6) <input type="checkbox"/> Other: _____ |

DETAILED ACTION

Priority

1. Acknowledgment is made of applicant's claim for foreign priority under 35 U.S.C. 119(a)-(d). The certified copy has been filed in parent Application No. 10/621447, filed on 07/18/2003.

Specification

2. Applicant is reminded of the proper language and format for an abstract of the disclosure.

The abstract should be in narrative form and generally limited to a single paragraph on a separate sheet within the range of 50 to 150 words. It is important that the abstract not exceed 150 words in length since the space provided for the abstract on the computer tape used by the printer is limited. The form and legal phraseology often used in patent claims, such as "means" and "said," should be avoided. The abstract should describe the disclosure sufficiently to assist readers in deciding whether there is a need for consulting the full patent text for details.

The language should be clear and concise and should not repeat information given in the title. It should avoid using phrases which can be implied, such as, "The disclosure concerns," "The disclosure defined by this invention," "The disclosure describes," etc.

On line 3, "means" needs to be replaced.

Claim Rejections - 35 USC § 112

The following is a quotation of the second paragraph of 35 U.S.C. 112:

The specification shall conclude with one or more claims particularly pointing out and distinctly claiming the subject matter which the applicant regards as his invention.

3. Claim 15 rejected under 35 U.S.C. 112, second paragraph, as being indefinite for failing to particularly point out and distinctly claim the subject matter which applicant regards as the invention. Claim 15 is a method claim; which depends on an apparatus claim (i.e. claim 1).

Claim Rejections - 35 USC § 103

The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negated by the manner in which the invention was made.

4. Claims 1, 7-9, 15 and 16 are rejected under 35 U.S.C. 103(a) as being unpatentable over applicants admitted prior art (background of invention) and Fujii (US 2002/0181557), further in view of Abe et al. (hereafter, referred as Abe) (US 6,990,160).

As to claims 1 and 9, applicant's admitted prior art discloses a channel estimation apparatus (see page 2, paragraph 04) in a digital communication system comprising: a correlation unit 111 for obtaining a correlation function of a first received signal by means of a correlation between a received synchronizing signal (i.e. the PN sequence) and a reference synchronizing signal (i.e. the reference PN sequence), and obtaining a correlation function of the received synchronizing signal by means of a correlation between the synchronizing signals; a first estimating unit 113 for estimating a first multi-path by applying a first threshold value to the correlation function of the first received signal. Applicant in the background of invention discloses all the subject matters claimed in claims 1 and 9, except for a correlation noise removing unit for obtaining a correlation function of a third received signal by removing correlation noise included in the correlation function of the first received signal, by means of the first multi-path and a second estimating unit for estimating a second multi-path by applying a second threshold value to the correlation function of the third received signal in which the

correlation noise has been removed. Fujii discloses a communication apparatus comprising a channel estimation section 102 (see paragraph 0025 and Fig. 3), which calculates a channel estimation value by calculating the correlation between a basic code and the midamble (i.e. a pilot symbol, see paragraph 0019) of receiving baseband signal. Fujii further discloses (see paragraph 0031) a JD demodulating section 108 which generates a matrix by predetermined processing using the channel estimation value of the path selected by path selection 107 of the corresponding user selected by user determining section 104, and executes demodulation to obtain the desired receiving data while canceling the interference (interpreted as correlation noise). It would have been obvious to one of ordinary skill in the art at the time of invention to modify the applicants admitted prior art to use a correlation noise removing unit as suggested by Fujii to avoid performance deterioration in the system (see the abstract and paragraphs 0039-0040). Applicant's background of invention and Fujii disclose all the subject matters claimed in claims 1 and 9, except for having a second estimating unit for estimating a second multi-path by applying a second threshold value to the correlation function of the third received signal in which the correlation noise has been removed. Abe discloses a communication apparatus comprising a rough timing estimator (with low accuracy) 6091 (see Fig. 11) and a fine timing estimator (with high accuracy) 6092 (see column 13, lines 27-34 and column 14, lines 56-65). Abe further discloses having a canceller that cancels intersymbol interference from the receiving signal; an operator that determines correlation between signals having intersymbol interference removed and corresponding taps respectively; and a known signal

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sequence; and an estimator that detects a tap coefficient that yields a maximum operation result in the operator (see claim 12). Abe is silent in disclosing that the estimation has been performed by applying a second threshold to the correlation function. However it is well known from the primary reference that the estimation has been performed using this method. It would have been obvious to one of ordinary skill in the art at the time of invention to modify Applicants background of invention and Fujii to use two estimators in the system to increase the accuracy of estimation and perform more correct symbol decisions (see column 22, lines 13-21).

As to claims 7 and 15, Fujii discloses (see paragraph 0031) that the JD demodulating section 108 generates a matrix using the channel estimation value of the path selected by path selection 107 (interpreted as the first multi-path) of the corresponding user selected by used determining section 104, and executes demodulation to obtain the desired receiving data while canceling the interference (interpreted as correlation noise). It would have been obvious to one of ordinary skill in the art at the time of invention to modify the applicants admitted prior art and Abe as suggested by Fujii to avoid performance deterioration in the system (see the abstract and paragraphs 0039-0040).

As to claims 8 and 16, applicant's admitted prior art discloses that the reference synchronizing signal is a PN sequence (see page 2, paragraph 04).

Conclusion

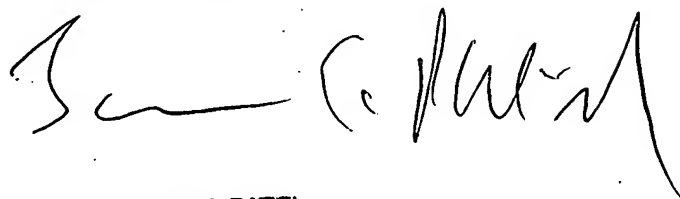
Any inquiry concerning this communication or earlier communications from the examiner should be directed to Leila Malek whose telephone number is 571-272-8731. The examiner can normally be reached on 9AM-5:30PM.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Mohammad Ghayour can be reached on 571-272-3021. The fax phone number for the organization where this application or proceeding is assigned is 571-273-8300.

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see <http://pair-direct.uspto.gov>. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free). If you would like assistance from a USPTO Customer Service Representative or access to the automated information system, call 800-786-9199 (IN USA OR CANADA) or 571-272-1000.

L.M

Leila Malek
Examiner
Art Unit 2611

A handwritten signature in black ink, appearing to read 'Jay K. Patel', is written over the printed name and title.

JAY K. PATEL
SUPERVISORY PATENT EXAMINER